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... The reason that a word is IMMEDIATE is normally because it is required to take some compile-time action, for example, LITERAL takes a number from the stack and encloses it, together with the run-time literal handler, in the new word so that the number may be returned to the ...

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The 801 minicomputer

G Radin - IBM Journal of Research and Development, 1983 - portal.acm.org

... in favor of high usage of primitive instructions (such as LOAD, STORE, BRANCH, COMPARE, ADD). ... Displacement (signed 16- or 26-bit word offset), or 0 Register + Register, BRANCH AND LINK ... branches are defined not only based upon the state of the Condition Register but ...

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Lx: a technology platform for customizable VLIW embedded processing

P Faraboschi, G Brown, JA Fisher... - ACM SIGARCH ..., 2000 - portal.acm.org ... also includes 64 32-bit General- purpose registers and 8 1-bit branch registers (used to store branch condition, predicates and ... The ISA includes a complete set of compare and logic operations and a separate set of 8 1-bit branch ... Branch Units are restricted only to cluster 0. 206 ... Cited by 302 - Related articles - Bt. Direct - All 20 versions

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Enhanced branch delay slot handling with single exception program counter

F Worrell - US Patent 5,774,709, 1998 - Google Patents ... also branches to an **instruction** at a target 55 **instruction** if a test **condition** is true. ... TLB Miss by simply fixing the TLB (Translation Lookaside Buffer) and executing a Jump Register to the ... When the computer instructions 45 to move a useful instruction from the branch target into the ...

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System for processing single-cycle branch instruction in a pipeline having relative, absolute, indirect and trap addresses

BW Case, RG Fleck, CG Kong... - US Patent 4,777,587, 1988 - Google Patents

... To return from the interrupt routine then, processor 10 will perform an indirect jump via the ... an indirect jump via the value saved by the "SAVE—PC-JUMP" instruction and will ... delay" instruction and a plurality of branch instructions each determining a "branch condition", stored in ...

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Formal verification of superscale microprocessors with multicycle functional units, exception, and branch prediction

MN Velev... - Proceedings of the 37th Annual Design ..., 2000 - portal.acm.org

... For example, an equality comparison of two data operands, as used to deter- mine the condition to take a branch-on-equal instruction, must be ... A return-from-exception instruction has the effect

of jump- ing to the ExceptionPC and clearing the exception status registers. ...

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... This condition is required to detect a taken branch that was predicted to be not taken ... If there is an exception or branch misprediction, the entire contents of the reorder buffer 20 are dis ... the instruction block, a dual ported block status array 42 that contains a branch block indicator ...

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... The condition code evaluation is further optimized at translation time by using the fact that the code ... On some hosts (such as x86 or PowerPC), a branch instruction is directly patched so that the ... longimp() is used to jump to the exception handling code when an exception such as ...

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[BOOK] Analysis of branch prediction strategies and branch target buffer design

JKF Lee, AJ Smith... - 1983 - eecs.berkeley.edu

... It is possible if the condition code affecting a conditional branch has already been determined ... We compare their results to our own as appropriate in the remainder of this paper ... first define two terms: Static Branch Instructions - This refers to the individual branch instructions found ...

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Machine organization of the IBM RISC System/6000 processor

GF Grohoski - IBM Journal of Research and Development, 2010 - leeexplore.ieee.org

... Figures 4(e) and 4(f) depict a taken conditional branch whose condition is set two fixed ... any pipeline delay are taken conditional branches that depend upon a fixed-point compare which cannot be scheduled with three or more instructions between it and the branch. ...

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Multi-instruction stream branch processing mechanism

JF Hughes, JS Liptay, JW Rymarczyk... - US Patent ..., 1980 - Google Patents ... RETRY CONTROLS 20-1- INSTRUCTION PREPROCESSING FUNCTION (IPPF) E-FUNCTION

23 THREE INSTRUCTION 21 STREAM PRE-FETCH 28 INSTRUCTION A PRÈ-DECODE ?q ... 29,

1980 Sheet 6 of 12 4,200,927 BCR Mi R2 BRANCH ON CONDITION BC MI X2 ...

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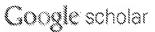


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ABCD: eliminating array bounds checks on demand

R Bodik, R Gupta... - ... of the ACM SIGPLAN 2000 conference ..., 2000 - portal acm.org ... There is one node for each e-SSA-variable, con- stant, or array-length literal (eg, the value A.length); edge weights constrain the differences ... A bounds check can be viewed as a special if statement that will transfer program's control into the exception handler if the ...

Cited by 176 - Related articles - Bt. Direct - All 30 versions

Compiling Java just in time

T Cramer, R Friedman, T Miller, D Seberger... - Micro, ..., 2002 - ieeexplore.ieee.org ... If the same array element is accessed more than once in a basic block, only the first ... Future compilers may perform more advanced analyses to eliminate unnecessary bounds checks ... The compiled code for an exception handler needs to locate the current values of local variables ... Cited by 130 - Related articles - Bt. Direct - All 10 versions

Marmot: An optimizing compiler for Java

R Fitzgerald, TB Knoblock, E Ruf... - Software: Practice ..., 2000 - interscience wiley.com ... and we eventually adopted Freund's minimalist approach of expanding try-finally handlers in line. ... yet a widely used technique, particularly in the face of Java's exception semantics. Several techniques for array bounds check optimization have been developed for Fortran [18-23 ...

Cited by 177 - Related articles - Bt. Direct - All 27 versions

Overview of the IBM Java just-in-time compiler

T Suganuma, T Ogasawara, M Takeuchi... - IBM Systems ..., 2010 - ieeexplore.ieee.org ... For example, a program may contain an infinitely running loop that exits only through an **array** index out-of-**bounds exception**... Once an **exception** of this type has been raised, the system-level **exception handler** directly calls the user-level **handler**, which is registered ...

Cited by 191 - Related articles - 8t, Direct - All 16 versions

A certifying compiler for Java C Colby, P Lee, GC Necula, F Blau... - ACM SIGPLAN ..., 2000 - portal.acm.org

... Specifically, we have hoisted and eliminated several null-pointer and array-bounds checks ... than the contents of the integer stored at address eax + 4, which is the length of the coefficients array ... ure 5) shows that an exception handler is a 5-word struc- ture, stored on the run-time ...

Cited by 227 - Related articles - BL Direct - All 28 versions

Implementing jalapeño in Java

B Alpern, CR Attanasio, A Coochi... - Proceedings of the ..., 1999 - portal acm.org ... below the virtual machine rather than above it, Jalapeiio reduces the **boundary**-crossing overhead ...

When these values are stored in the boot-image array, it is written to ... Exception Handling - The exception handler (like the garbage collector) uses the memory access facilities to ...

Cited by 257 - Related articles - Bt. Direct - All 9 versions

Automated test-data generation for exception conditions

N Tracey, J Clark, K Mander... - Software: Practice and ..., 2000 - interscience.wiley.com ... Constraint Error exceptions occur when a value goes out of range; examples include type bounds, array bounds, arithmetic underflow/overflow and attempts to divide by zero. ... The problem of structural test coverage of the exception handler is addressed in a similar manner. ...

Cited by 82 - Related articles - Bt. Direct - Ali 22 versions

Java bytecode to native code translation: the caffeine prototype and preliminary results

CHA Hsieh, JC Gyllenhaal... - ... of the 29th annual ACM/IEEE ..., 1996 - portal acm.org ... can be captured by the try-block's handler. Fourth, for maximum portability, exception handling support in the Java interpreter does not rely on the underlying architecture or operating system. Thus, the interpreter explicitly checks for null references, array index bounds, divide by ...

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Processor with accelerated array access bounds checking

M Tremblay, JM O'connor... - US Patent 6,014,723, 2000 - Google Patents ... in the C programming language, and instead has true arrays in which array bounds are explicitly checked, thereby eliminating vulnerability to many viruses and nasty bugs. The JAVA programming language includes objective-C interfaces and specific exception handlers. ...

Cited by 51 - Related articles - All 4 versions

Design, implementation, and evaluation of optimizations in a just-in-time compiler

K Ishizaki, M Kawahito, T Yasue...- Proceedings of the ..., 1999 - portal.acm.org ... rs : Check array-bounds mulli r4, 14. 2 1wzx I-3. r4cr5, i Get array element twi LLT, I-7. 1; Check divisor divi r3, r3, 1-7 _........ The **handler** void TrapHandler(struct context I cp) int *iar = cp-SIAR; // Get the address a~ which // the **exception** occurs if IS_TRAPI-EQ(iar ...

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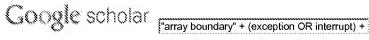
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Processor with accelerated array access bounds checking

M Tremblay, JM O'connor... - US Patent 6,014,723, 2000 - Google Patents

... The array boundary check- ing apparatus of the invention includes an associative memory element that stores and retrieves a plurality of array bound values. ... The JAVA programming language includes objective-C interfaces and specific exception handlers. ...

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[PDF] OpenJIT Backend Compiler

K Shimura - 1998 - openjit.org

... function name description arrayCheck check array boundary resolveClass for anewarray, multianewarray, checkcast, instanceof resolveField for putfield, getfield ... it can be detected inside of compiled code or runtime routines and thrown to appropriate exception handler. ...

Clied by 3 - Related articles - View as HTML

[CITATION] Exception Handling

N Ryan

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Programmable IC with gate array core and boundary scan capability

GA Baxter, KB Buch... - US Patent 6,226,779, 2001 - Google Patents

... An exception to this rule is when the FPGA configuration process did not involve other parts of the system (eg, configuration was under the control of the FPGA), in which case configuration can sometimes be skipped without affect- ing system functionality. ...

Cited by 12 - Related articles - All 2 versions

Hardware/software optimization for array & pointer boundary checking against buffer overflow attacks

Z Shao, J Cao, KCC Chari, C Xue... - Journal of Parallel and ..., 2006 - Elsevier

... Exception SignalFig. 4. The implementation of the special bound checking instruction in

DLX.take advantage of the special boundary checking instruction tooptimize the

performance. The previous software optimization mainly focuses on opti-mizing array boundary ...

Cited by 1 - Related articles - All 12 versions

Robust two-dimensional weighted and unweighted phase unwrapping that uses fast transforms and iterative methods

DC Ghiglia... - Journal of the Optical Society of ..., 1994 - opticsinfobase.org

... The rewrapped val- ues depicted in Fig. 2 are shown in Fig. 3 and are quali- tatively consistent (with the possible exception of an in-consequential constant bias) with the original input depicted in Fig. 1. Because the original input was noise Fig. ...

Cited by 401 - Related articles - Bt. Direct - All 10 versions

A floating point rectangular systolic array on a chip

RJ Clarke, IA Curtis, AP Clarke... - ... Automation towards the ..., 2002 - leeexplore.leee.org

... The use of serial data both minimises the 1/0 pin count at the array boundary and allows adjacent processing elements to both ... 2.3.4 Exception Processing: IEEE encoded data is processed according to IEEE standards with the exception of some rounding modes, and the ...

Cited by 1 - Related articles

System and method for low overhead boundary checking of java arrays

LC Goff, DR Evoy... - US Patent 6,782,407, 2004 - Google Patents

... a system- to the array to get blocked, and a read access to the array to data cache 30 and array boundary checker 50. get effectively ignored. In addition, the same error signal The Local-Variable memory 20 includes high perfor- 15 also causes an Exception Status register in a ...

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[BOOK] OKI advanced array processor (AAP) hardware description

BR Musicus, GNS Prasanna... - 1991 - mit.dspace.org

... 50 5.8. Micro-Interrupt System 51 5.9. ... individually programmable direction select possible via SL register bits, but data transfer not supported at array boundary. - only 3 sixteen bit busses available, limiting transfer capabilities, ...

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Memory device and method for redundancy/self-repair

B Kleveland, A likhahar... - US Patent App. 10/ ..., 2001 - Google Patents

... The memory device 40 also comprises read/write control 60, an exception handler 70, a row decoder 80, and a redundant row decoder 90. [0025] In operation, the read/write control 60 attempts to write data in the primary memory array 52 at a given address. ...

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K Shimura - 1998 - openjit.org

... nop branch call return tblsw ret ... function name description arrayCheck check array boundary resolveClass for anewarray, multianewarray, checkcast, instanceof resolveField for ... detected inside of compiled code or runtime routines and thrown to appropriate exception handler. ...

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[PS] Survey of Buffer-Overflow Protection

K Piromsopa... - cse msu.edu ... Control data can be divided into several types: return addresses, function pointers, and **branch** slots. ... All n&ffsrs Exception Function Virtual methods Other Var Function return add res execution flow EBP-"4 ... int i) { I void fune(char i— int j = 0; J CFoo foo; (* fp) (int) = & fune char ...

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Search-based software test data generation: A survey

P McMinn - Software Testing, Verification and Reliability, 2004 - interscience wiley com-

... The condition determining whether a **branch** is taken is referred to as the **branch** predicate. ... A use of a variable v is a node in which v is referenced, for example in an assignment statement, an output statement, or a branch predicate expression. ...

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[PDF] Improving Branch Predictability in Java Processing

T Li, LK John... - 2001 - Citeseer

... Our analysis [Li01] shows that the highly biased branch site distribution, combined with the abundance of runtime exception checking codes (eg, class verifier and array boundary checking) that are seldom taken, lead ...

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[PDF] Optimising Java Programs Through Basic Block Dynamic Compilation

IA Rogers - 2002 - cs.man.ac.uk

... 3Some JIT compilers, such as LaTTe [LYK+99], do not translate exception handling regions of code as they assume they are infrequently executed. Page 19. ... The first basic block performs the array creation and loop initialisation, then it performs an unconditional branch to the ...

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[PDF] RDB: A system for incremental replay debugging

MW Shapiro - Master's thesis, Deptartment of Computer Science, ..., 1997 - Citeseer ... of a program in order to detect particular types of program errors, such as memory access violations, memory leaks, or **array boundary** violations. ... The instrumentation library's signal **handler** then maps a new page of anonymous memory in at the virtual memory page boundary ...

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Graphical display of complex information within a Prolog debugger

AD Dewar... - International Journal of Man-Machine Studies, 1986 - Elsevier

... options be set or unset for a particular instance of a call, nor to interrupt asynchronously in ... left or lower-right corner of the display of that array (ie when an array boundary element is ... high-level goal, and moving down the right-most 514 AD DEWAR AND JG CLEARY branch of its ...

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[PDF] Evolutionary search for test data in the presence of state behaviour

... A number of experiments show the value of the approach for both test objects with states and test objects with input-output behaviour. For all test objects considered, higher levels of branch coverage are obtained. i Page 4. ... 61 2.5.2 Exception Condition Testing

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[BOOK] Optimal Path Queries in Very Large Spatial Databases

J Zhang... - 2005 - Citeseer

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BW Case, RG Fleck, CG Kong... - US Patent 4,777,587, 1988 - Google Patents ... and will perform an indirect jump via the value saved by the "SAVE—PC-JUMP" instruction and will ... at step (d) and the contents of said program counter, based on said branch condition saved at ... pipeline during a cycle next-fol- lowing a cycle during which said branch delay was ...

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Mechanism for implementing one machine cycle executable trap instructions in a primitive instruction set computing system

MA Auslander, J Cocke, HT Hao... - US Patent ..., 1986 - Google Patents

... Architecture Conference Proceedings It is a primary object of the present invention to pro- vide a 'trap' instruction and mechanism ... of a primitive reduced instruction set machine system, as compared to several machine cycles of a compare and branch condition sequence on ...

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System for reducing delay for execution subsequent to correctly predicted branch instruction using fetch information stored with each block of instructions in cache

WM Johnson - US Patent 5,136,697, 1992 - Google Patents

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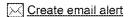
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